

MATERIALS ENGINEERING SEMINAR

“Corrosion Products and Phase Evolution of AA7075 Alloy in an Aqueous NaCl Environment”

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ABSTRACT

The high specific strength of aluminum alloys makes them strong candidates for structural applications. Their vulnerability to corrosion in seawater, however, limits their mechanical strength. Relationships between composition and structural integrity will affect future alloy design. Layers of mixed oxides and hydroxides that grow on the alloy surface in an aqueous environment directly influence the long-term corrosion resistance of aluminum alloys. Here, we provide a comprehensive analysis of the chemical composition, microstructure, and processes governing the development of the corrosion layer/product made of aluminum and the high-strength alloy AA7075-T651 when subjected to a 3.5 wt.% t NaCl solution. Further, we address the limitations and research gaps in understanding the corrosion mechanisms. In order to link the structure of the product layer in both its hydrated and dehydrated states with the change in mechanical characteristics, a unique in situ nanoindentation approach was used. Furthermore, we will discuss corrosion products, layer growth mechanisms, and distribution in AA7075 alloys.

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School of Materials Engineering

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